



THE ARTICLE

STAMMER,

15

FROM

"THE PENNY CYCLOPÆDIA."

BY RICHARD CULL,

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BY THE SAME AUTHOR,

OBSERVATIONS on IMPEDIMENTS of SPEECH,
with some remarks on their successful treatment, in a Letter addressed
to T. J. PETTIGREW, Esq. F.R.S. F.A.S. F.L.S. &c. &c.

STAMMERING considered with reference to its cure
by the application of those laws which regulate utterance, in a Letter
addressed to GEORGE BIRKBECK, Esq. M.D. F.G.S. &c. &c.

A DISCOURSE on PUBLIC READING, prefixed to a
New Edition of Garrick's Instructions for Reading the Liturgy of the
Church of England.

* * MR. CULL educates and trains the voice and speech for public
exertion in the Church, the Senate, at the Bar, and on the Stage.

Mr. Cull continues to remove Stammering, and other Difficulties
and Defects of Utterance, on the principles of training stated in the article
Stammer.

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STAMMER. —The terms stammer and stutter are synonymously adopted to denote the involuntary interruption of utterance arising from difficulty and often total inability to pronounce certain syllables, the speech apparatus being frequently affected with spasm in the effort to speak.

In some stammerers the spasm consists of involuntary movements similar to *chorea* (St. Vitus's dance), which occasionally affects other than the speech muscles. Stammer with this spasm distorts the utterance by an involuntary repetition of some part of the syllable, as ge-ge-ge-good de-de-de-day. The repetitions may or may not be vocal. In other stammerers the spasm consists of involuntary immobility, similar to *tetanus* (lock-jaw), commonly of the form termed *trismus*, in which the mouth is closed, and the jaw cannot move to open it; and sometimes of the form termed *anti-trismus*, in which the mouth is open, and the jaw is equally incapable of moving to shut it. Stammer with this spasm distorts the utterance by an involuntary extension of some part of the syllable, as l——ugh, where the *l* is much prolonged.

In the looseness of language resulting from

inexact knowledge, all kinds of difficult and defective utterance are misnamed stammer; as the difficult utterance of the intoxicated, the faltering utterance of the paralytic, the imperfect utterance of deep emotion, as of fear, the defective utterance of malformed organs of speech, and the hesitation in discourse when the suitable word fails to present itself to a speaker's mind. Such affections of the utterance, however, are distinct from stammer, for

1. The stammerer's inability to pronounce words remains during health, soberness, calmness of mind, and also when the appropriate words occur to him.

2. The stammerer feels his difficulty of utterance essentially to consist in a refusal of some part of the speech-apparatus to obey his will.

3. The stammerer's utmost efforts to force out any difficult word commonly excite spasm, and increase it if it previously existed.

4. The stammerer's inability to speak is intermittent: the same syllable is not always equally difficult to utter, and is sometimes uttered with ease.

These circumstances will distinguish stammer from the misnamed stammer of paralysis, intoxication, &c.

Now to understand the nature of stammering, it is necessary to know the audibility and mechanism of utterance, which may be thus briefly described:—

The voice is produced in the larynx, whence it issues into the pharynx. The pharynx opens into the nose and into the mouth; and by means of a curtain valve, named the *velum pendulum palati*, we

can direct the issue of breath through the mouth or the nose, or through both mouth and nose at once. The voice is produced in the larynx, an audible sound, which may possess the distinctions of song-notes (musical sounds), as those of pitch, loudness, and quality, or it may possess the peculiar conditions of those distinctions which constitute speech-notes. In the pharynx and mouth the volume of voice is magnified, and its quality is modified.

The elementary sounds of which speech is composed are further modifications of the voice, apart from and added to its pitch, loudness, and quality; and are produced in the mouth, pharynx, and nose. The popular classification of these sounds into vowels and consonants is adopted, from its convenience. The vowel *sounds* of the English language are represented by the vowel letters in the following words: *all, arm, an, ale, end, eel, her, isle, in, old, ooze, on, us, cube, pull, our, and oil*. The vowels are of two kinds, viz. :—

1. Those which present a uniform sound, and thence are named monophthongs, as *oo* of the word *ooze*, in which it will be observed, on verification, that the cavity and aperture of the mouth remain the same during the whole time of uttering the vowel. The monophthongs are contained in the following examples: *end, eel, her, in, and ooze*.

2. Those which present a complex sound, in which the sound is ever varying from the initial to the final point, as in the *a* of the word *ale*, in which

it will be observed on verification that the cavity and aperture of the mouth gradually change their forms from the initial to the final sound of the vowel. The *a* of *ale* ends in *ee* of *eel*. From the circumstance of the initial and final parts of the vowel presenting different sounds, it is termed a diphthong. The diphthongs of the English language may be conveniently classified by the similarity of their final sounds :—

1st class of diphthongs	} ale, the final sound is <i>ee</i> of <i>eel</i> .
end in a well-defined	
<i>ee</i> of <i>eel</i> .	
	<i>isle</i> ,
	<i>oil</i> ,
2d class of diphthongs	} old, the final sound is <i>oo</i> of <i>ooze</i> .
end in a well-defined	
<i>oo</i> of <i>ooze</i>	
	<i>cube</i> ,
	<i>our</i> ,
	} all, the final sound is <i>e</i> of <i>her</i> .
3d class of diphthongs	
end in an obscure and	
faint <i>e</i> of <i>her</i> .	
	<i>arm</i> ,
	<i>an</i> ,
	<i>on</i> ,
	<i>us</i> ,
	<i>pull</i> ,

The above table may be thus verified. Slowly drawl the vowel, making the final part as loud as the initial ; preserve the mouth's position which moulded the final part of the diphthong *after* the cessation of voice, and then a new issue of voice through that adjustment of the mouth will produce the diphthong's final sound as a distinct monophthong.

The consonants are conveniently classed into those with and those without voice. The voice consonant *sounds* of the language are represented by the consonant letters in the following words : *ebb*, *add*, *egg*, *all*, *am*, *an*, *red*, *vow*, *we*, *you*, *zone*, *sing*, *azure*, *then*,

jew. It will be observed on verification that these consonants have each voice throughout their duration, and that each as a separate sound can be prolonged to the utmost limit of the breath, except *b*, *d*, *g*, and *j*, which only admit of slight extension.

The voiceless consonants are represented by the consonant letters in the following words : *up*, *at*, *ark*, *if*, *hope*, *quit*, *soon*, *chip*, *skin*, *thin*, *when*. It will be observed on verification that these consonants have no voice throughout their duration ; that they each have breath-sound, similar to a whisper, except *p*, *t*, *k*, which are perfectly mute ; and that the remainder, except *ch*, *q*, and *wh*, can be indefinitely prolonged.

It is necessary, however, for our purpose, to examine the whole of the consonants from another point of view. The consonants, like the vowels, are monophthongal and diphthongal. It will be observed on verification that one adjustment of the mouth, and one sound throughout, are characteristics in the mechanism and audibility of the following consonants :—*ebb*, *add*, *egg*, *all*, *am*, *an*, *sing*, *vow*, *zone*, *azure*, *then* ; and of *up*, *at*, *ark*, *if*, *hope*, *soon*, *ash*, *thin*, which are therefore named monophthongal consonants. It will be observed on verification that a complex sound and a change in the mouth's adjustment are characteristics of the following : *red*, *we*, *you*, *jew* ; and of *queen*, *chin*, *when*, which are thence named diphthongal consonants.

These elementary sounds of speech are the materials of the language. The utterance of these sounds

is technically termed enunciation; their junction together to form syllables is termed articulation, of which there are three kinds, viz. :—

1. A vowel preceding a consonant, as *eat* = *ee-t*.
2. A consonant ,, vowel ,, *fee* = *f-ee*.
3. ,, ,, consonant ,, *bl* = *b-l*.

In articulating those sounds it will be observed, 1st, that the mouth changes its adjustment for the second sound while voice is flowing through it; 2nd, that in the first example the mouth gradually closes, in order to produce the consonant; and 3d, that in the second example the mouth gradually opens to produce the vowel.

Observation and experiment concur to prove that the production of voice is an acoustic phenomenon depending on mechanical principles similar to those which regulate the production of sound from an inanimate instrument; for it is now agreed that the upward current of air passing through the larynx produces an effect on the vocal ligaments precisely similar to what it would if the larynx were *cæteris paribus* an inanimate mechanism. The voluntary power over the larynx adjusts it *to be acted on* by the current of air, and thus the voice is to be regarded partly as a mechanical and partly as a physiological result.

Observation and experiment concur to prove that the modification of voice into speech is also an

acoustic phenomenon depending on principles similar to those which regulate the modification of sound by an inanimate instrument; for it is now agreed that the modification of voice into speech in passing through the variable cavity of the pharynx, mouth, and nose, produces an effect precisely similar to what would be produced if the variable cavity were *cæteris paribus* an inanimate mechanism.

Thus, both in voice and speech, the production and modification of vocal sound depend on the laws of acoustics, while the adjustments of the various parts of the apparatus which produce and modify the voice depend on voluntary muscular movement. The one is mechanical, the other physiological.*

It is familiarly known that the movement of every organ is effected by muscular contraction; that both voluntary and involuntary contraction of the muscles depends on the nerves; that all voluntary contraction is regulated by the brain; and also that the voluntary contraction of one muscle is accompanied by an adjusted voluntary relaxation of its antagonist muscle.

* It is a curious fact, that mechanicians constructed speaking machines to imitate the human voice and speech, long before philosophers had determined how far speech is a mechanical result. It is more curious, that the mechanician Kempeler excludes acoustics in his definition of a vowel, which he entirely deduces from the organs of the human mouth; thus forgetful alike of the circumstance that parrots can utter words, and that his own mechanism uttered certain vowels.

The speech-apparatus may be considered as consisting of the lungs or bellows, which can send a current of air through the trachea or windpipe to the larynx, which is situated on its summit.

In the larynx this current of air can be vocalized into song, or into speech-sounds, at will, which, on passing through the variable cavity, consisting of the mouth, pharynx, and nose, can be further modified into speech. Thus the speech-apparatus, as a whole machine, consists of the respiratory, the vocal, and the enunciative organs.

The respiratory-apparatus consists of the chest, the lungs, and the air-passages. The respiratory movements are involuntary and periodic; the inspiration of breath alternates with its expiration; and in both acts the breath flows in a continuous stream. There is a periodic action of the inspiratory muscles, but whether their action alternates with an *action* of the expiratory muscles, or simply with the spontaneous return of the parts by their elasticity and gravity, is yet undetermined. The muscular actions, during the tranquil respiration of repose, appear to be limited to periodic inspiratory movements.

The movements of respiration include the motions of the diaphragm, the abdominal and thoracic muscles, and those of the larynx, which dilate and contract the aperture of the glottis. The nerves engaged in these movements are the phrenic, the spinal acces-

Variable
cavity.

Larynx.

Trachea or
Windpipe.Lungs or
Bellows.

sory, the vagus, many of the spinal nerves, and the portio dura of the seventh. The will can influence and somewhat modify the movements of respiration: thus we can prolong or shorten the duration of an inspiration, and we can delay or hasten to begin one. We have similar control over the expiration of the breath; and we have power also to limit, or nearly so, the movements of respiration to sub-groups of muscles: thus we can breathe by the diaphragm alone, or by the ribs alone.

Sir Charles Bell, in the "Philosophical Transactions," 1832, has shown how the respiratory muscles can be changed at will into voluntary muscles by means of the thyro-arytenoid muscles; as, when a sailor leaning his breast over a yard-arm can raise himself and perform various acts by aid of the inspiratory muscles, which for a time he causes to act under the will. It is, however, during speech and song that the respiratory apparatus is most completely placed under control. Indeed, in the act of vocalizing, whether for speech or song, the involuntary is almost superseded by the voluntary act of respiration. The will gives a different play to the chest. We breathe less by the diaphragm, and more by the ribs; we shorten the duration of the inspiration, and completely change the character of the expiration. A person about to speak is observed to take a voluntary inspiration, which elevates the chest, draws the abdomen flatter, and frequently also raises the shoulders.

There are two modes of involuntary inspiration:

in the one, the breath issues in one continuous unbroken stream, as in the ordinary breathing of unruffled tranquillity, which by some emotions is hurried and involuntarily vocalized, producing sighs, groans, &c.; in the other mode the stream of breath is interrupted so that it issues in detached portions, which during some emotions is also involuntarily vocalized, producing laughter, crying, &c.

The will has power to produce voluntary expirations in both modes. The unbroken stream is termed the exhausting breath, which is so often required for a long-drawn note in song. The broken stream is termed the holding breath, which is constantly required in lengths suitably adjusted to the demands of the syllables as they occur in speech. The beauties of utterance, and the economy of muscular exertion, which result from a dexterous use of holding breath in public reading and speaking, would require much space to describe.

The machinery of respiration, of vocalization, and of enunciation, together constitute the speech-apparatus. The various muscles subservient to those separate acts associate their functions to adjust and give play to the speech-apparatus as a united whole—as a machine for the production of speech. Thus to pronounce an elementary sound, as the *ee* of the word “eel,” the muscles of speech (consisting of the respiratory, the vocal, and the enunciative) act in simultaneous association to produce the proper adjustment of the speech-apparatus. There are nearly fifty distinct elementary sounds in the English

language, and hence as many different adjustments of the speech-apparatus are required for their utterance. And to pronounce a word consisting of several elementary sounds articulated together, as the word *steam* (which consists of the elements *s*, *t*, *ea*=*ee* of *eel*, and *m*), the simultaneous group of associated muscular movements required for each element must succeed each other in one syllabic impulse. Now it will be observed that in adjusting the speech apparatus from a previous state of rest to pronounce any given element, the muscles have a certain movement to perform, but the movement is somewhat different when they have to readjust the speech-apparatus from a previous adjustment. This fact may be verified in pronouncing the *ee* of *eel* by itself as a distinct syllable, and afterwards the word *steam*, where the same vowel follows a *t*, from which adjustment that for the *ee* has to be made. The general conditions of respiration, vocalization, enunciation, and articulation, under which stammer occurs, are subjoined.

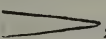
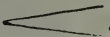
I. RESPIRATION. — 1. Most stammerers manage their respiration badly, although nearly all can speak freely in a whisper. 2. They feel they have insufficient breath to speak. This sensation, however, arises less from an insufficiency than from attempting to speak on an involuntary inspiration. The breath is expired to be vocalized by the voluntary action of the ribs, which mechanically contract the chest's cavity. The ribs, however, cannot accomplish this

when they are in the position in which an involuntary inspiration leaves them; they must be raised to that position to which a voluntary inspiration carries them, before they can act with mechanical effect on the chest to expire a holding breath for the purpose of conversation. 3. With the sensation of insufficiency of breath, some feel also a pain at the pit of the stomach. This pain is connected with attempting to speak on an involuntary inspiration, and its severity is commonly increased by struggling to speak.

II. VOCALIZATION. — 1. *Song-voice*. — The song condition of voice seldom presents any difficulty to stammerers. The writer of this article has seen only three cases of stammer in the song-voice; and it is familiarly known that stammerers, when struggling with a difficult word, are advised to *sing it*.

2. *Speech-voice*. — The distinguishing features of this voice are described in the article ELOCUTION. Stammer occurs in all parts of the speech-note; more frequently however in the middle than towards the end, but most commonly at the initial.

3. *Pitch of Voice*. — Changes of pitch, whether concrete or discrete (slide or skip), through narrow intervals of the scale, present difficulties which wider changes of the scale do not. Stammerers can mostly declaim, if they cannot converse or quietly read; and it is well known that wider intervals of pitch occur in declamation than in ordinary conversation.

4. *Loudness of Voice*.—When the loudness of the speech-note is of the form of the musical *diminuendo*, which begins abruptly and gradually diminishes in loudness, as thus figured , a difficulty is presented to the stammerer which does not occur if the form be the musical *crescendo*, where the note begins feebly, and gradually increases in loudness, as thus figured .

5. *Quality of Voice*.—The conversation tone presents a greater difficulty than the falsetto, or than the full and enriched voice of epic declamation.

6. *Quantity or Duration of Syllables*.—Short and inextensible syllables present a greater difficulty than the long and extensible.

7. *Accent*.—The unaccented syllables of discourse seldom offer any difficulty to stammerers. The element, or combination of elements, which is difficult to utter with accent, is easy to utter without accent. The accent given by stress is infinitely more difficult than that given by extended duration.

8. *Rhythmus*.—The measured movement of verse is easier for the stammerer than the unmeasured movement of prose and conversation.

III. ENUNCIATION.—Syllables are of two kinds, viz. :—

1. Those composed of one elementary sound.
2. Those composed of more than one elementary sound.

1. *Vowels*.—A vowel alone may constitute an accented syllable, and even a whole word, of which the pronoun *I* and the article *a* are familiar examples. Stammer often occurs on such syllables. The diphthongal vowels present less difficulty than the monophthongal ; and the long much less than the short vowels.

2. *Consonants*.—A consonant alone never constitutes a syllable ; and when two or more are combined together without a vowel to form one, such occur only as unaccentuated final syllables of words. The stammerer's difficulty is less to utter the elementary sounds singly, than to articulate them so as to form syllables.

IV. ARTICULATION.—As before stated, the elementary sounds are articulated in three orders of succession :—

1. The vowel followed by a consonant.
2. The consonant followed by a vowel.
3. The consonant followed by a consonant.

Stammer occurs in each of these modes of articulation. There is seldom any difficulty to articulate two consonants together ; some, however, is felt in postfixing a consonant to a vowel, and the greatest is felt in adding a vowel to a consonant. Of this latter class there is most stammer when the consonant is P, T, K, or their voice correlatives B, D, G, espe-

cially if they precede a short vowel ; as in the examples pit, top, king, bud, dot, get.

To these general conditions of voice and speech under which stammer occurs, may be added some other conditions, as

SEX.—The great majority of stammerers are of the male sex.

AGE.—Few stammer from their early infancy ; children commonly speak freely until about five years of age. An occasional difficulty is first observed, which becomes more frequent up to the tenth year, when it is commonly at its maximum ; although the spasm frequently increases in severity up to manhood. In the decline of life sometimes the stammer spontaneously diminishes, and it has been known to entirely disappear. The voices of childhood and old age differ in several respects from that of the intermediate period of life. A comparison of these voices with the above-described vocal conditions of stammer will account for the occasional spontaneous disappearance of stammer in old age.

Voice of Childhood.—The speech melody of infancy is set in a high pitch, which often runs into the falsetto, and is much intersected with wide intervals both concrete and discrete. The loudness is chiefly of the *crescendo* form on long whining quantities.

Voice of Old Age.—The speech melody often falls into the tremulous scale, the rate of utterance is slow, steady, and uniform ; the loudness not often of

the *diminuendo* form, and is on extended quantities. The accent is given to syllables by quantity rather than by stress, deliberate pauses are made, and the whole style is marked by the self-possession of experienced age conversing with a consciousness of superiority, if in nought else, in a longer reach of memory.

TEMPERATURE.—Sudden changes, especially from a high to a low temperature, commonly increase a stammer. The cold of travelling outside a coach in winter also increases it. It is well known that cold produces involuntary movements in chattering of the teeth and shivering of the whole body: hence the effect of cold on the stammerer's speech is what we are prepared to expect: it lessens his voluntary power over his speech-apparatus, and thus increases his stammer.

Stammerers have a greater difficulty in conveying new information than in uttering what they are aware is known to the hearer.

We now proceed to describe the varieties of stammer.

Voice stammer is of two kinds:—

- I. Difficulty to produce voice.
- II. Difficulty to produce voice in quantities adjusted to the syllable's demands.

I. Difficulty to produce voice.

First Variety.—That difficulty which arises from ill regulated respiration, in which the effort to vocalize

is accompanied with a feeling of insufficiency of breath. The stammer arises from an attempt to speak on an involuntary inspiration, when from mechanical considerations alone we know that the ribs cannot much control the chest to regulate the issue of breath to the larynx. A holding breath cannot be maintained on an involuntary inspiration, and therefore voluntary respiration for speech must always begin with an inspiration of breath.

The physiology of this stammer indicates a discipline for its removal. The organs of respiration must be drilled to rightly change the involuntary act of respiration to the voluntary, which, with a course of rhythmus, will effect a permanent cure.

Second Variety.—That difficulty to produce voice which is occasioned by an involuntary closure of the glottis. In this variety of stammer, instead of the larynx receiving the adjustment for vocalization in ready obedience to the will, the glottis suddenly closes, either by an involuntary associate movement, or by a tetanic spasm, probably in most cases by the latter. Some years since, Dr. Arnott pointed out the nature and means to cure it. His remedy consists in keeping open the glottis, by issuing a drone sound, such as the *e* of the word berry, before beginning to speak, and in joining this prefixed drone to the words. See his “Elements of Physics,” vol. i. p. 603, et seq. Dr. Arnott’s remedy, however, has fallen in repute, probably from the subjoined circumstances :—

1. It has been indiscriminately applied to remedy all varieties of stammer.

2. Where applicable, the principle has not been fully carried out as a discipline to the glottis. And

3. From neglect to accompany the special training of the glottis with a general rhythmical training of the whole speech-apparatus.

Third Variety. — That difficulty to produce voice which is occasioned by an involuntary twitching of the glottis similar to chorea. The larynx obediently receives the vocalizing adjustment, but 'so soon as the current of breath presses against the vocal cords, they involuntarily start from the adjustment with a sudden twitching, as if the glottal muscles were seized with St. Vitus's dance, which occasions several short sounds to be jerked out similar to those of loud laughter. This spasm is sometimes so soon excited as to preclude vocalization, when only short iterations of breath are audible. The glottis must be disciplined on sounds of the *crescendo* form of loudness in a low pitch, and proceed gradually from the song-voice to that of speech. Respiration and speech-voice training will follow, accompanied with general rhythmic discipline to the whole speech-apparatus for reading and speaking both verse and prose.

II. Difficulty to produce voice adjusted to the syllable's demands.

In this stammer the difficulty is not to produce voice, but to control its quantities. Vocalization freely takes place, but the event of two or three short

or accented syllables following near together throws the glottal muscles into choreal spasm. And in most cases there is an occasional want of harmony between the actions of the expiratory muscles of the chest and those of the larynx, so that the holding breath is not fully under control. There appear to be two causes in operation to produce this stammer, viz. a tendency to spasm in the larynx, and a defect in the power to associate the movements of the chest muscles with those of the larynx. The principles of discipline for the spasm will be similar to the preceding variety of stammer : while a distinct discipline must be projected to acquire a higher degree of associating power, the nature of this special discipline will depend on the nature of the defect, which should, however, be accompanied with a general training to associate all the muscles in action.

Speech stammer is of two kinds :—

- I. Enunciative, or difficulty to produce the elementary sounds.
- II. Articulative, or difficulty to join them together.

I. ENUNCIATIVE STAMMER.

1. *On the Vowels.*—The difficulty of uttering a monophthongal vowel is a voice stammer, it being an absence of voluntary control over the vocalization of the breath. The difficulty of uttering a diphthongal vowel may be either a voice or a speech stammer, and is often a combination of both. When the difficulty is to produce voice to begin the vowel,

the stammer is vocal ; and when the difficulty is to change the adjustment from that for the initial, to that for the final sound of the diphthong, it is a speech stammer. Three diphthongs end in *ee* of *eel*, *ale*, *isle*, *oil*. Now to produce this final sound, the mouth's cavity and aperture are contracted by raising the lower jaw, and bringing the lips parallel to each other ; which adjustment is effected by the masseter, the labial, and their groups of muscles, including their antagonists. These are disobedient to the will, so that the stammerer finds himself unable to control the jaw and the lips. Three diphthongs end in *oo* of *ooze*, viz. *old*, *cube*, *our*. Now to produce this final sound, the aperture of the mouth is contracted by pursing together the lips, while the lower jaw is sufficiently depressed to allow free egress to the voice ; which adjustment is effected by the orbicular muscles of the lips with its group including their antagonists, while the masseter and its antagonist hold the jaw in its required place. The stammerer finds himself unable to control the lips while he holds the jaw. The remaining diphthongs are less marked, and as diphthongs never present a difficulty to the stammerer.

2. *On the Consonants*.—The difficulty to utter a monophthongal consonant is a voice stammer, it being an absence of voluntary control over the vocalization of the breath. The difficulty to utter a diphthongal consonant may be either a voice or a speech stammer, and is often a combination of both. When the difficulty is to produce voice to begin

the consonant, the stammer is vocal ; and when the difficulty is to change the adjustment from that for the initial to that for the final sound of the consonant, it is a speech stammer. The diphthongal consonants are *r, w, y, j ; q, ch, wh*. In producing these sounds the stammerer's difficulty consists, in the *R*, to vibrate the tongue ; in the *W*, to move the lips, while depressing the jaw ; in the *Y* to control the lips ; in the *J*, to move the tongue while depressing the jaw ; in the *Q*, to separate the soft palate and root of the tongue along with the lips' movement ; the *Ch* and *Wh* present similar difficulties to the *J* and *W*.

Stammer on the single elementary sounds of speech can be permanently remedied only by a systematic training of the disobedient organ which occasions it. The organ must be disciplined to perform the necessary movements under all conditions of voice, which, accompanied with a general training of the whole apparatus of speech, conducted on rhythmical principles, will effectually remove the stammer.

II. ARTICULATIVE STAMMER.

Stammer occurs in all three modes of articulation, viz. :—

1. A consonant followed by a vowel, as *bee*.
2. A vowel followed by a consonant, as *ebb*.
3. A consonant followed by another consonant, as *bl* of the word *bled*.

1. *A Consonant followed by a Vowel*.—This class of difficulties in articulation is occasioned by an inability to change the consonant adjustment of the mouth to that for the vowel. There are three varieties of difficulty of this class.

First Variety.—The adjustment of the mouth for the consonant is found, on attempting to change it for the vowel, to be immoveably fixed as if by tetanic spasm. This occasions an undue extension of the consonant: thus the word *laugh* is distorted into *l—aug*, from inability to move the tongue at will. It is remarkable, that until the attempt to move the tongue is made, there is no consciousness of its being involuntarily fixed.

Second Variety.—The attempt to change the adjustment produces a twitching similar to chorea. Thus, to illustrate the effect on the same word *laugh*, the tongue's tip involuntarily slaps against the palate, producing a repetition of the consonant, which occasions the word to be distorted into *l-l-l-l-laugh*.

An involuntary repetition of this consonant may, however, occur without spasmodic twitching of the tongue. An instance lately occurred, in the practice of the writer, in which, without retraction of the tongue's tip from the palate, the *l* was iterated. On examination it was found to be occasioned by a voice stammer, the third variety of the first kind of voice stammer.

Such cases indicate the necessity of correctly ascertaining what part of the speech-apparatus pro-

duces the stammer, in order to adapt a special discipline to train it to readily perform its necessary movements.

The initial consonant is often voluntarily repeated, in a new attempt to utter a syllable, which may be mistaken for this variety of stammer.

Third Variety.—The attempt to change the adjustment produces an involuntary associate movement of some portion of the speech-apparatus, occasions a syllabic sound to be uttered, in place of the required vowel. Thus, in attempting to pronounce the word *laugh*, the *l* is freely produced, but suddenly the syllable *fit* is involuntarily jerked out, perhaps more than once, when the word *laugh* is at last pronounced.

The involuntary associate movements are commonly similar in the same person, and consequently the involuntary syllabic sound is similar; but different persons present varieties of movement, and thence of involuntary syllables; thus one iterates the syllable *fit*, another *gub*, a third *dup*, a fourth *bed*, or *bet*, &c.

II. *A Vowel followed by a Consonant.*—This class of difficulties in articulation is occasioned by an inability to change the vowel adjustment of the mouth to that which is required for the consonant. Nearly all stammerers can freely join a consonant to an initial vowel, but many find a difficulty in postfixing a consonant to a vowel which is already articulated to an initial consonant, as in the word *better*, where

the stammer occurs in articulating the *t* to the *e* of the first syllable, which it distorts into *be-t*.

This stammer most frequently occurs when the consonant to be articulated to the vowel requires a movement of the tongue's tip for its formation, as the *s*, *t*, *l*, *d*, *r*, *n*, *zh*, *sh*, *j*, *ch*, and *th*, in such words as *master*, *latter*, *willing*, *reader*, which are respectively distorted to *ma-ster*, *la-tter*, *wi-lling*, *rea-der*. In some cases the tongue appears fixed as by lock-jaw, and resists attempts to move it ; while in others the impulse of the will appears not to reach it. This stammer occurs most in dissyllabic words ; the consonant, and with it the succeeding syllable, is often produced by a kind of hiccup, after an involuntary prolongation of the vowel.

III. *A Consonant followed by another Consonant.*—This class of difficulties in articulation is occasioned by an inability to change one consonant adjustment to that for another. It occurs amongst the initial consonants of a syllable, frequently prolonging both ; thus distorting the word *slay* into *s-l-ay*. Sometimes the difficulty is to control the tongue's movements, as in the syllables *pray*, *bleed*, *clip*, and frequently the difficulty is to control the movements of the lips, as in the words *small*, *speak*, &c.

Stammer on articulating the elementary sounds of speech to form syllables, can be permanently remedied only by a systematic training of the disobedient organs to perform their required movements for the

several adjustments of the mouth which are necessary to articulation. The training must be general and special. The general is a rhythmic training of the whole speech-apparatus ; and the special is a training of the disobedient organ to perform its various movements in articulation, under, 1st, all conditions of voice ; 2nd, in all sequences of elementary combinations ; and 3rd, under varied conditions of mind and external circumstances. The mode and order of application of these principles of training will depend on the vocal and general conditions under which the stammerer can freely speak.

This brief analytic statement of these different kinds of stammer illustrates the position that stammer is a consequence of inability to make the muscular movements which are necessary to utterance.

Writers have misled themselves by assuming that all stammering depends on one cause. There are advocates for mental, for organic, and for mechanical causes. Those who believe in a mental cause, however, differ in opinion : thus, one refers the defect to indecision ; another to absence of mind ; and another to confusion of ideas, or to loss of presence of mind. The advocates for an organic cause differ also : thus, one refers it to weakness of the muscles engaged in utterance : another to confusion of the speech-apparatus by the too rapid irradiation of will to it ; while others adopt the term *nervous*, as if it indicated a special cause. Those who advocate a mechanical cause are no less at variance : as

one refers it to irregular teeth ; another to too large a tongue ; and another to the obstruction which enlarged tonsils and uvula occasion.

These, and similar conjectures, will be cleared away, and the inquiry will be narrowed, by stating what does not produce stammering, that is to say, does not cause the inability to produce, control, and associate the muscular movements of utterance. The familiar circumstances : 1, Of stammerers speaking freely under certain states of mind, and in certain conditions of voice ; 2, Of the stammer sometimes entirely disappearing for a few hours or even days ; for stammer is popularly known to be intermittent, though not periodically so ; 3, Of its being increased by certain states of mind and conditions of voice ; and 4, Of its being diminished also by certain other states of mind and conditions of voice. All these circumstances concur to prove, first, that stammering is not caused by any fixed ill constitution of mind, or weakness of will ; and, secondly, that it is not caused by any structural defect in the brain, the nerves, or the muscles ; for a structural defect would *always* produce an imperfect action*.

* Medical men have lately drawn public attention to stammering, in announcing its cure by surgical operation. The remedy proposed by one surgeon is the removal of part of the tongue ; that of another is the division of the frænum and hyo-glossi muscles ; and that of a third is to excise the uvula and tonsils. Now enlarged tonsils and uvulæ exist ; large tongues also, and tongues bound down by the frænum and the hyo-glossi muscles, without the co-existence of stammer ; and the writer of this article states both advisedly

These circumstances, together with the fact of the numerous cures effected by the late Mr. Thelwall, and by the author of this article, with no other means than training the speech-apparatus, firmly establish the truth, that the cause of stammering is entirely functional.

Our analytic description of stammering reveals three functional causes of inability to control the muscular movements which are required for utterance, viz. —

I. Spasm, both of the tetanus and chorea forms. All muscles are liable to spasm. Spasm of the larynx, the tongue, the lips, and the masseter muscle, are each sources of stammering.

II. Defect in the associating power, which combines the voluntary movements of different organs in one simultaneous act, or in an allied succession of acts. Defective association of vocalization with

and emphatically, that very few stammerers have any deviation from the ordinary structure and condition of mouth. He has witnessed these operations, and his observations coincide with the statements of the medical journals on their utter want of success; and also on the danger of at least one of them.

The Medico-Chirurgical Reviewer of Dieffenbach's memoir on excising part of the tongue, condemned it, and thought it necessary to caution his readers "not to allow their minds to be too much influenced by the reports of *immediate* success after the operations," and adds a note on the "foolish practice of reporting cases of surgical operations almost immediately after their performance, and often before their ultimate results can be known," and which he reprehends as "only worthy of an advertising quack." (*Med. Chir. Rev.* July 1841.)

respiration will occasion stammer ; for perfect association of the voluntary movements of the larynx with those of the chest are required in utterance. The movements of the larynx and chest are effected by means of the laryngeal, the recurrent, and the expiratory nerves.

Some stammerers can associate these movements with facility, but stammer from inability to associate with them the movements of the jaw and lips, whose movements are effected by means of the third trunk of the fifth pair of nerves. And other stammerers, who can associate these movements, are unable to associate with them the movements of the tongue, which are effected by the eighth and ninth pairs of nerves, and they stammer in consequence.

III. Involuntary associate movements ; as, after mimicing a stammerer, it has been found that those muscular movements, which in the mimicry were *voluntarily* associated with the proper movements of utterance, have suddenly become linked to them so firmly in allied motion, that he is unable to dissociate them, and an actual stammer results. Thus these movements which were voluntary in the mimicry are now (in accordance with an ill understood law of nervous action) excited independently of, or even contrary to the will, by the voluntary impulse which is directed to effect the proper movements of utterance.

Some movements spontaneously ally themselves with others ; as those of the corresponding parts of

the two sides of the body. Many persons without conscious imitation are prone to establish involuntary associate movements. And apart from all imitation, involuntary movements associate themselves in allied series with the voluntary movements ; whence the origin of awkward habits. This peculiarity of disposition is often the precursor of stammering. Persons thus sensitive may acquire the habit of stammering after a conversation with a stammerer. It is stammering which originates in this cause only which can be accurately termed a habit.

The great distinction between functional derangement and vicious structures (whether arising from original formation or from organic disease) is both broad and clear. Thus the three causes of stammer above stated are functional.

The adoption of appropriate remedies for stammering, then, will depend on the following conditions, viz. :—1, On the part of the speech-apparatus which is affected ; 2, On the cause producing the stammer ; and 3, On the vocal and other conditions under which the utterance is least affected.

The principles dependent on the first condition were incidentally stated in the description of the varieties of stammer. The principles dependent on the second condition are subjoined ; and the details in carrying out these combined principles depend on the third condition.

I. *Spasm*.—The great object to be effected is to enable vocalization and utterance to take place with-

out (the impulse of the will) throwing the part into spasm. The value of voluntary periodic movements in allaying spasm of the speech-apparatus is immense, as is seen in its enabling spasmodic stammerers to sing and to read smooth verse with facility. The suggestion offered by this fact should be well followed out. Let the respiration of utterance be strictly periodic, it will then be a voluntary act, and let the voluntary act always begin with an inspiration of the breath. Mark time with the hand and foot, march in time, count time both verbally and mentally, in short periodicize every moment of body and mind, in harmony with all the varieties of English versification. The rhythmus of blank verse, of prose, and of conversation, will follow. The speech-apparatus should be disciplined by going through a course of rhythmical training for the voice, such as is laid down in Cull's "Discourse on Public Reading."

II. *Defect in the associating power.*—The great object to be effected is to obtain control over two or more voluntary movements, so as to combine them, both simultaneously and in those allied successions which are required in utterance. The stammerer must be trained to accomplish the several movements of utterance, on principles similar to those adopted to train a musical pupil. At first the piano-forte student exerts a distinct impulse of the will for each separate movement of each finger. He in time becomes a musician, and is now scarcely conscious of exercising the will to effect the movements in playing

the piano. He now learns to sing ; and rightly conceiving the note for the voice, he would sing it, but is unable to connect the piano accompaniment with it. His mind is absorbed in the song-note, and the instrument halts ; he therefore gives more attention to the piano, and now his voice halts. His difficulty is to control two distinct sets of voluntary movements (that of the hands and that of the voice) in one combined act of accompanying his own voice. As each note of the music is read, it becomes an incitement to move this or that finger ; each note of the song line becomes an incitement to adjust the larynx to intonate it ; and each word of the song becomes an incitement to adjust the speech-apparatus for its utterance. The pupil is trained in various combinations of these movements, from the simplest to the most complex, so that they immediately follow his perception of the music, in allied and simultaneous groups. And when these perceptions are firmly fixed in the mind, so as to be recalled at will (remembered), the act of memory will incite the movements in similar groups.

He who has failed spontaneously to acquire the perfect association of the voluntary movements which are required in utterance, and who in consequence stammers, must be systematically taught to acquire it. When he is able to associate the voluntary movements in all the necessary groups by means of perceptions, that is to say by *reading* what he utters, he may be unable to reproduce the movements

by the mere incitement of memory, but able again to do so by recurring to his book. When, however, he can accomplish this, he may be unable to take part in a conversation ; for if he thinks on a subject, and endeavours to express his ideas in suitable language, while he yet requires concentrated attention to control the movements of utterance, he will falter somewhere ; either in the language, if his attention be given to the utterance ; or in the utterance, if the attention be given to the language. Training and practice will be required to cultivate the power of associating together the movements of utterance, while the mind is occupied in giving language to its ideas. It is common, even after the patient can converse with facility, for the stammer to recur from any confusion of mind ; as a sudden noise, an unexpected visitor. This will require a special training, while the patient is cautiously brought within the influence of the disturbing force.

III. *Involuntary associate movement.*—The great object to be effected is to break the association, and thus insulate the proper movements of speech from all associate movements. In making one voluntary movement an awkward person makes several others which are involuntary : thus many persons move the head and loll out the tongue while writing, many musicians have ungainly habits associated with their performance, and the ill habits of orators is a common theme of censure. By discipline these ill habits can be dissociated from the necessary movements.

Some movements have a great tendency to accompany others, as one finger that of another. Instrumental musicians offer excellent examples of the power of insulating the movements of each finger from that of the rest. By training they acquire rapidity, exactness, and decision in the movements of each finger, along with the ability to associate those movements in every possible permutation, without the intrusion of an involuntary movement. A training of the speech-apparatus on similar principles is followed by similar results. The elementary sounds of the language, in the several conditions of voice, must be systematically persevered in, under the guiding voice and the watchful ear of an experienced tutor.

The great principle which governs the construction of details, in carrying out the foregoing views, is to advance from the simple to the complex, basing the whole on that vocal condition which is most free from stammer.

The attentive reader will see that it is impossible to state more than general principles of the discipline to which the speech-apparatus must be subjected, to remedy the various kinds of stammer. He will also remark that active and accurate observation, combined with continuous exertion of mind, in adapting the instruction and training to the peculiarities of the case, is required in the tutor; and that much depends on the stammerer. On him alone depends a persevering exercise of his speech-apparatus in the

projected discipline ; and on him alone depends that concentration of his own mind, in watching for the occasions to apply the knowledge and power which he daily acquires ; and for these acts of his own mind nothing whatever can be substituted.

It is difficult to obtain accurate statistics of stammering. Dr. Colombat estimates the proportion in France to be 1 to every 5397 inhabitants. The author of this article estimates a higher proportion in Great Britain, viz. 1 to every 3500. Of stammerers the writer's practice has shown only 13 per cent. to be females.

The writer's object has been to give an accurate statement of the facts of stammering, and of the principles which he has found successful in its treatment. The reader may consult with advantage Thelwall's *Letter to Cline on Stammering* ; Dr. Arnott's *Physics* ; Cull's *Observations on Impediments of Speech* ; and Cull's *Stammering Considered*.